Firmware Upgrade for FR-A800-P Inverters (FR-A800 Series) and FR-CC2-P Converter Units (FR-CC2 Series)

Thank you for your continued patronage of Mitsubishi Electric drive control products.
The firmware of FR-A800-P inverters (FR-A800 series) and FR-CC2-P converter units (FR-CC2 series) will be upgraded to improve functionality.

1. Products Affected

FR-A800-P inverters (FR-A800 series)
FR-CC2-P converter units (FR-CC2 series)

2. Details of Change

(1) Addition of the emergency drive function
The inverter can continue driving the motor in case of emergency such as a fire, since protective functions are not activated even if the inverter detects a fault. Using this function may damage the motor or inverter because driving the motor is given the highest priority. Use this function for emergency operation only. The operation can be switched to the commercial power supply operation at the occurrence of a fault which may cause damage of the inverter.

The emergency drive function is available only when the function is set in the master inverter. To enable the emergency drive function, the function must be set in both the master inverter and the master converter unit (FR-CC2-P).

Parameters (FR-A800-P)
(For parameters of the FR-CC2-P converter units, refer to the FR-CC2-P Instruction Manual.)

Pr.	Name	Initial value		Setting range	Description
		FM	CA		
67 H301*1	Number of retries at fault occurrence	0		0 to 10, 101 to 110	Select whether to output the Fault (ALM) signal during the retry operation while the emergency drive operation is performed. 0 to 10: The ALM signal is not output during retry. 101 to 110: The ALM signal is output during retry.
69 H303*1	Retry count display erase	0		0	Setting "0" clears the retry success counter ("retry success" means that the inverter successfully restarts).
523 H320*1	Emergency drive mode selection	9999		100, 111, 112, 121, 122, 123, 124, 200, 211, 212, 221, 222, 223, 224, 300, 311, 312, 321, 322, 323, 324, 400, 411, 412, 421, 422, 423, 424	Select the operation mode of the emergency drive.
				9999	Emergency drive disabled.

Pr.	Name	Initial value FM	CA	Setting range	Description
524 H321*1*2	Emergency drive running speed	9999		0 to 590 Hz*3	Set the running frequency in the fixed frequency mode of the emergency drive (when the fixed frequency mode is selected in Pr.523).
				0% to 100%*3	Set the PID set point in the PID control mode of the emergency drive (when the PID control mode is selected in Pr.523).
				9999*3	Emergency drive disabled.
515 H322*1	Emergency drive dedicated retry count	1		1 to 200	Set the retry count during emergency drive operation.
				9999	Without retry count excess (no restriction on the number of retries)
1013 H323*1	Emergency drive running speed after retry reset	60 Hz	50 Hz	0 to 590 Hz	Set the frequency for operation after a retry when any of E.CPU, E.1 to E.3, and E.5 to E.7 occurs during emergency drive operation.
514 H324*1	Emergency drive dedicated waiting time	9999		0.1 to 600 s	Set the retry waiting time during emergency drive operation.
				9999	Waiting time: 1 s
136 A001*1	MC switchover interlock time	1 s		0 to 100 s	Set the operation interlock time for MC2 and MC3.
139 A004*1	Automatic switchover frequency from inverter to bypass operation	9999		0 to 60 Hz	Set the frequency at which the inverter-driven operation is switched over to the commercial power supply operation when the condition for the electronic bypass is established during emergency drive operation.
				9999	Electronic bypass during emergency drive is disabled.
57 A702*4	Restart coasting time	9999		0	Coasting time differs according to the inverter capacity. (Refer to the description of the automatic restart after instantaneous power failure function in the Instruction Manual (Detailed) or the Instruction Manual (Function).)
				0.1 to 30 s	Set the delay time for the inverter to perform a restart after restoring power due to an instantaneous power failure.
				9999	No restart

*1 The function is available only when the parameter is set in the master inverter. Settings in the slave does not enable the function.

*2 Set Pr.524 after setting Pr.523.

*3 When Pr.523 = "100, 200, 300, or 400", the emergency drive is activated regardless of the Pr.524 setting.

*4 When setting Pr.57, set the same setting value in the master and the slave.

◆ Emergency drive operation selection (Pr.523, Pr.524)

Use Pr.523 Emergency drive mode selection to select the emergency drive operation. Set a value in the hundreds place to select the operation when a valid protective function is activated (critical fault) during emergency drive operation. Set values in the ones and tens places to select the operation method.

Pr.523 setting	Emergency drive operation mode			Description
1[][]	Output shutoff mode		Selecting operation when a critical fault occurs during emergency drive operation	Output shutoff when a critical fault occurs.
2[][]	Retry / output shutoff mode			Retry operation when a critical fault occurs. Output shutoff when a critical fault for which retry is not permitted occurs or when the retry count is exceeded.
3[][]	Retry / commercial mode			Retry operation when a critical fault occurs. The operation is switched over to the commercial power supply operation when a critical fault for which retry is not permitted occurs, or when the retry count is exceeded. While Pr.515 = "9999", the operation is switched over to the commercial power supply operation when the retry count reaches 200.
4[][]	Commercial mode			The operation is switched over to the commercial power supply operation when a critical fault occurs.
[]00	Normal operation		Selecting the operation method during emergency drive operation	The operation is performed with the same set frequency and by the same starting command as those in the normal operation.
[]11	Fixed frequency mode	Forward rotation		The operation is forcibly performed with the frequency set in Pr.524. Even when the motor is stopped, the operation is started by the emergency drive execution.
[]12		Reverse rotation		
[]21	PID control mode	Forward rotation		The operation is performed under PID control using the Pr.524 setting as a set point. The measured values are input in the method set in Pr.128.
[]22		Reverse rotation		
[]23		Forward rotation (Second PID measured value input)		The operation is performed under PID control using the Pr.524 setting as a set point. The measured values are input in the method set in Pr.753.
[]24		Reverse rotation (Second PID measured value input)		
9999	Emergency drive disabled.			

◆ Retry operation during emergency drive (Pr.515, Pr.514)

- Set the retry operation during emergency drive operation. Use Pr.515 Emergency drive dedicated retry count to set the retry count, and use Pr.514 Emergency drive dedicated waiting time to set the retry waiting time.
- The ALM signal output conditions depend on the Pr.67 Number of retries at fault occurrence setting.

◆ Electronic bypass during emergency drive (Pr.136, Pr.139, Pr.57)

- For selecting the commercial mode (Pr.523 = "3[][], 4[][]"), setting is required as follows. Set Pr.136 MC switchover interlock time and Pr.139 Automatic switchover frequency from inverter to bypass operation and assign MC2 and MC3 signals to output terminals. When the CS signal is assigned to an input terminal, set Pr.57 Restart coasting time ≠ "9999" and input the CS signal through the terminal. (In the initial setting, the CS signal is assigned to the terminal CS.)

- During emergency drive operation, the operation is switched over to the commercial power supply operation when any of the following conditions is satisfied.
  The CS signal turns OFF.
  A critical fault for which retry is not permitted occurs while Pr.523 = "3[][]".
  A critical fault occurs while Pr.523 = "4[][]".
- While the motor is driven by the inverter during emergency drive operation, if a condition for electronic bypass is satisfied, the output frequency is accelerated/decelerated to the Pr.139 setting. When the frequency reaches the set frequency, the operation is switched over to the commercial power supply operation. (The operation is immediately switched over to the commercial power supply operation during output shutoff due to a critical fault occurrence.)
- If the parameter for electronic bypass is not set while the commercial mode is set (Pr.523 = "3[][], 4[][]"), the operation is not switched over to the commercial power supply operation even when a condition for switchover is satisfied, and the output is shut off.
- To assign the MC2 and MC3 signals to output terminals, use any two of Pr.190 to Pr.196 (Output terminal function selection) and set "18 (positive logic)" for the MC2 signal and set "19 (positive logic)" for the MC3 signal.
- Operation of magnetic contactor (MC2, MC3)

Magnetic contactor	Installation location	Operation	
		During commercial power supply operation	During inverter operation
MC2	Between power supply and motor	Shorted	Open
MC3	Between inverter output side and motor	Open	Shorted

- The input signals are as shown below.

Signal	Function	Operation		MC operation*3	
				MC2	MC3
CS	Inverter/bypass	ON	Inverter operation*1	×	○
		OFF	Emergency drive commercial power supply operation	○	×
X84	Emergency drive operation	ON	Emergency drive operation	-	-
		OFF	Normal operation*2	×	○
RES	Operation status reset	ON	Reset	×	No change
		OFF	Normal operation	-	-

*1 The operation is not switched over to the inverter-driven operation even when the signal is turned ON after switchover to the emergency drive commercial power supply operation.

*2 The operation is not switched over to the normal operation even when the signal is turned OFF during emergency drive operation.

*3 MC operation is as shown below.

| Notation	MC operation
○	ON
×	OFF
-	During inverter operation: MC2-OFF, MC3-ON During commercial power supply operation: MC2-ON, MC3-OFF
No change	The operation status before changing the signal state to ON or OFF is held.

CAUTION

When the emergency drive operation is performed, the operation is continued or the retry is repeated even when a fault occurs, which may damage or burn the inverter and motor. Before restarting the normal operation after using this function, make sure that the inverter and motor have no fault. Any damage of the inverter or the motor caused by using the emergency drive function is not covered by the warranty even within the guarantee period.

◆ Connection diagram

A connection diagram of the emergency drive (commercial mode) is as follows.

• Example for driving a single wound motor by two inverters in parallel.
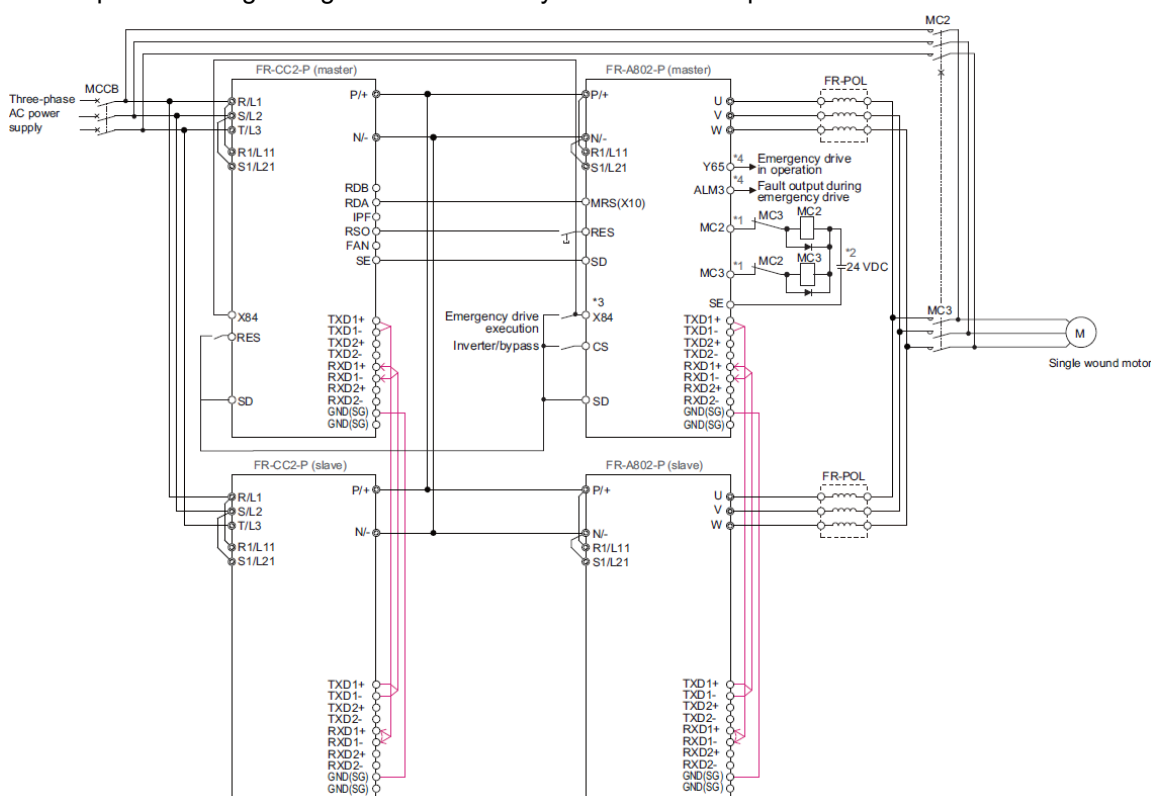
*1 Be careful of the rated specifications of output terminals.

Output terminal	Rated specification
Open collector output of inverter (RUN, SU, IPF, OL, FU)	Permissible load: 24 VDC 0.1 A
Inverter relay output (A1-C1, B1-C1, A2-C2, B2-C2) Relay output option (FR-A8AR)	Contact capacity: 230 VAC 0.3 A 30 VDC 0.3 A

*2 When connecting a DC power supply, insert a protective diode. When connecting an AC power supply, use relay output terminals of the inverter or contact output terminals of the relay output option (FR-A8AR).

*3 The applied terminals differ by the settings of Pr.180 to Pr.189 (Input terminal function selection).

*4 The applied terminals differ by the settings of Pr.190 to Pr.196 and Pr.320 to Pr.322 (Output terminal function selection).

* Be sure to provide a mechanical interlock between MC2 and MC3.

(2) Addition of supported plug-in options (for FR-A800-P)

The following table shows availability of the plug-in options for the master and the slave inverters during the parallel operation.

○ indicates that the option is available, and Δ indicates that the option is available but some functions are unavailable.

Name	Model	Master	Slave
EtherNet/IP	A8NEIP_2P	○	Δ*1
PROFINET	A8NPRT_2P	○	Δ*1
EtherCAT	A8NECT_2P	○	Δ*1
PROFIBUS-DP V1	A8NDPV1	○	Δ*1

*1 Only the monitoring function is available.

3. Date of Change

Country of origin	Date of Change
MADE IN JAPAN	The change will be sequentially applied to the February 2022 production or later.
MADE IN CHINA	The change will be sequentially applied to the March 2022 production or later.

4. Product Identification

The SERIAL (determined by date of production) can be checked on the product's rating plate.

□   2   2   ○○○○○○
Symbol Year Month Control number

SERIAL

The SERIAL consists of one symbol, two characters indicating the production year and month, and six characters indicating the control number.

The last digit of the production year is indicated as the Year, and the Month is indicated by 1 to 9, X (October), Y (November), or Z (December).